Volunteer Lake Assessment Program Individual Lake Reports

WICWAS LAKE, MEREDITH, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	5,312	**Max. Depth (m):**	10.9	**Flushing Rate (yr^{1})**	2
Surface Area (Ac.):	328	**Mean Depth (m):**	3.9	**P Retention Coef:**	0.58
Shore Length (m):	9,500	**Volume (m^{3}):**	5,110,500	**Elevation (ft):**	502

TROPHIC CLASSIFICATION

Year	Trophic class
2009	MESOTROPHIC
2009	MESOTROPHIC

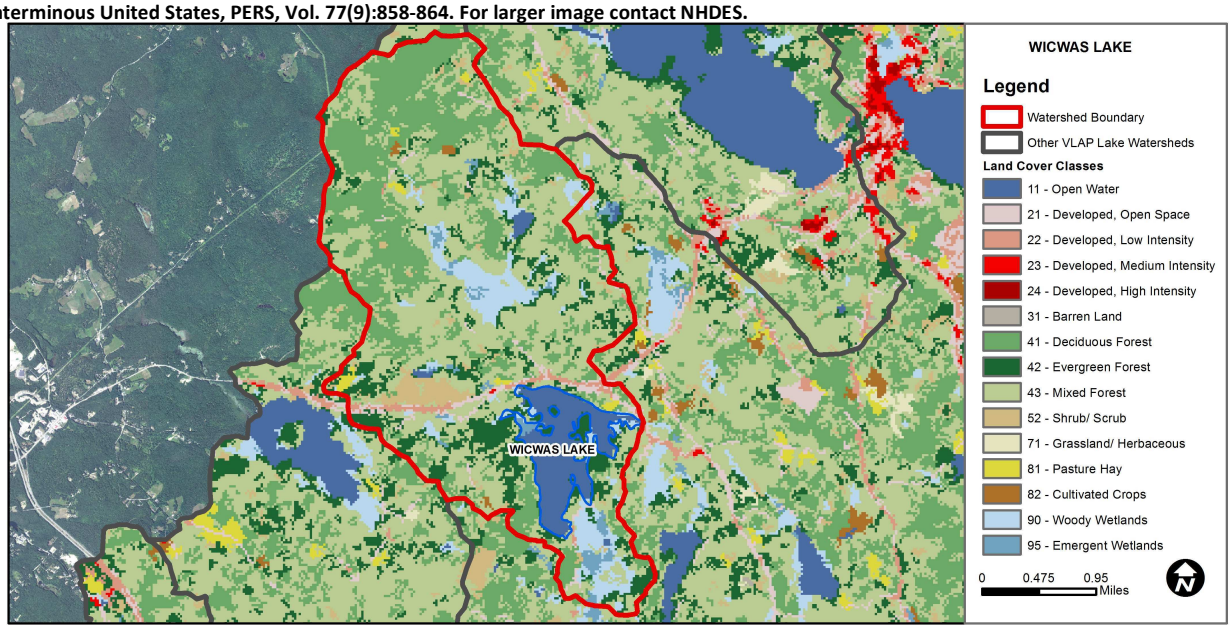
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	6.47	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	1.73	Deciduous Forest	26.65	Pasture Hay	0.59
Developed-Low Intensity	0.92	Evergreen Forest	12.49	Cultivated Crops	0.24
Developed-Medium Intensity	0.02	Mixed Forest	39.88	Woody Wetlands	6.75
Developed-High Intensity	0	Shrub-Scrub	2.66	Emergent Wetlands	1.57

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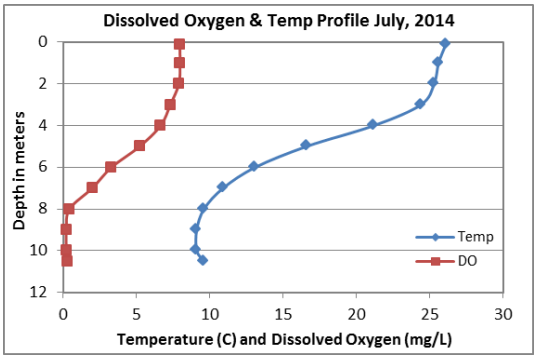
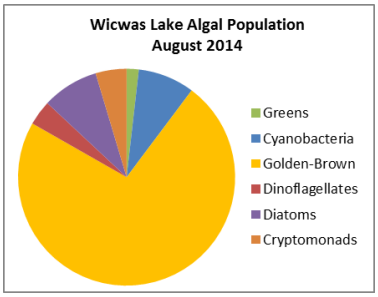
Wicwas Lake, Meredith

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were in a low range, were less than the state median, and returned to normal levels after the spike in 2013. Historical trend analysis indicates highly variable chlorophyll levels since 2002.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels were slightly greater than the state medians but remained within an average range for NH lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic (upper water layer) conductivity since 2002. We hope to see this continue!
- **E. coli:** Inlet, Cove and Boat Launch E. coli levels were low and much less than the state standards of 88 cts/100 mL for public beaches and 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels were the lowest measured since monitoring began and historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus since 2002. We hope to see this continue! Metalimnetic (middle water layer) phosphorus was low, however hypolimnetic (lower water layer) phosphorus was elevated. Hypolimnetic turbidity was also elevated and dissolved oxygen levels were less than 1.0 mg/L indicating the potential release of phosphorus from bottom sediments, a process called internal phosphorus loading. Tributary and Cove phosphorus levels were very low.
- **Transparency:** Transparency was good, better than the state median, and improved greatly from 2013 due to the decreased algal growth. Historical trend analysis indicates highly variable transparency since 2002. Transparency measured with the viewscope (VS) was much better than that measured without and likely a better representation of actual conditions.
- **Turbidity:** Epilimnetic and metalimnetic turbidities were low, however hypolimnetic turbidity was elevated indicating the potential formation and accumulation of organic compounds under anoxic conditions. Tributary and cove turbidities were also low.
- **pH:** Epilimnetic pH was within desirable range 6.5—8.0 units, however metalimnetic and hypolimnetic pH were less than desirable and potentially critical to aquatic life. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- **Recommended Actions:** The improving epilimnetic conductivity and phosphorus are encouraging, keep up the great work! Increase monitoring frequency to three times per summer, typically June, July and August, to decrease variability in data and better assess seasonal and historical water quality trends. Historically, cyanobacteria blooms have occurred in the lake, and with the potential of an internal load of phosphorus in the hypolimnion, it is important to minimize the external phosphorus loads from the watershed. Educate lake and watershed residents on stormwater management, utilization of phosphate free fertilizers, smart boating practices, and maintaining vegetated shoreline buffers. Keep up the great work!





Station Name	Table 1. 2014 Average Water Quality Data for WICWAS LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	5.3	3.88	11	63.0		3	4.63	5.33	0.63	6.80
Metalimnion				64.0		9			1.24	6.09
Hypolimnion				71.0		26			12.45	6.13
East Cove			11	63.0	10	3			0.51	6.78
Launch Ramp					10					
Outlet				65.5		6			1.01	6.64
Rte 104 Inlet			11	65.0	10	3			0.68	6.81
West Cove			11	64.0	10	3			0.53	6.86

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.